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10/776,203	02/12/2004	Rajiv Yadav Ranjan	50103-553	2760

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EXAMINER
MCDONALD, RODNEY GLENN

ART UNIT	PAPER NUMBER
1753	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/776,203

Applicant(s)

RANJAN ET AL.

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2-12-04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Masahide (Japan 06-158311).

Regarding claims 1, 13, Masahide teach a cathode sputtering apparatus and method for forming a uniform thickness layer of a selected material on at least one surface of a substrate in a multi stage process comprising deposition of a plurality of sublayers. (See Abstract; Example; Fig. 1; Fig. 5; Machine translation paragraph 0038-0042) In Figs. 1 and 5 a first group of spaced apart cathode assemblies are present. (See Figs. 1 and 5) The substrate is moved in the direction of arrows past the group of targets which implies a means for transporting for depositing a plurality of sub-layers on the first surface of the substrate. (See Figs. 1 and 5) Each target assembly of the first group of target assemblies comprises a sputtering surface oriented substantially parallel to the first surface of the substrate. (See Figs. 1, 5) The first group of target assemblies is adapted to provide sub-layers with different sputter film thickness profiles such that the first plurality of sub-layers collectively form a uniform thickness layer of selected material. (See Fig. 1, 5 and especially (a), (b), (c) and (d) diagrams which shows the sum of the different profiles forming a final uniform thickness profile of (d))

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Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagano (Japan 01-287269).

Regarding claims 1, 13, Nagano teach a cathode sputtering apparatus and method for forming a uniform thickness layer of a selected material on at least one surface of a substrate in a multi stage process comprising deposition of a plurality of sublayers. (See Abstract; Figs 1, 2) In Fig. 1 a first group of spaced apart cathode assemblies are present. (See Fig. 1) The substrate is moved by rollers past the targets for depositing a plurality of sub-layers on the first surface of the substrate. (See Fig. 1) Each target assembly of the first group of target assemblies comprises a sputtering surface oriented substantially parallel to the first surface of the substrate. (See Fig. 1) The first group of target assemblies is adapted to provide sub-layers with different sputter film thickness profiles such that the first plurality of sub-layers collectively form a uniform thickness layer of selected material. (See Figs. 1, 2; From Figure 2 is shown that target 10 forms the profile a and targets 12 form the profile b. The sum of the profiles a and b form the uniform thickness profile c for the substrate.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-8, 11, 14-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Hedgcoth (U.S. Pat. 4,894,133) in view of Masahide (Japan 06-158311).

Regarding claim 2, Hedgcoth teach providing targets to coat both sides of a substrate. (See Fig. 1; Column 4 lines 31-35)

Regarding claim 3, Hedgcoth suggest locating target in vertical registry. (See Figs. 1 and 2)

Regarding claim 4, Hedgcoth locating targets 42 in a single vacuum chamber. (See Figs. 1 and 2)

Regarding claim 5, Hedgcoth suggest an in-line arrangement. (See Figs. 1 and 2)

Regarding claim 6, Hedgcoth suggest locating targets 42 and 44 in different vacuum chambers. (See Figs. 1 and 2; Column 4 lines 7-8)

Regarding claim 7, Hedgcoth suggest the plurality of vacuum chamber arranged in-line. (See Figs. 1 and 2)

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Regarding claim 8, Hedgcoth suggest that the targets should be magnetron targets. (Column 4 lines 33-35; Column 4 lines 52-55)

Regarding claim 11, Hedgcoth suggest means 6 for transporting and mounting at least one disk shaped workpiece. (Column 4 line 4; Fig. 2)

Regarding claim 15, Hedgcoth suggest locating target in vertical registry. (See Figs. 1 and 2) Hedgcoth teach forming coatings on each of the first and second surface simultaneously. (See Figs. 1, 2)

Regarding claim 16, Hedgcoth suggest an in-line arrangement. (See Figs. 1 and 2)

Regarding claim 17, Hedgcoth suggest the plurality of vacuum chambers arranged in-line. (See Figs. 1 and 2)

Regarding claim 20, Hedgcoth suggest means 6 for transporting and mounting at least one disk shaped workpiece. (Column 4 line 4; Fig. 2)

The differences between Hedgcoth and the present claims is that utilizing groups of targets to coat both sides of the substrate to produce a uniform thin film is not discussed. (Claims 2, 14)

Regarding claims 2, 14, Since Masahide recognize utilizing a group of targets to form a uniform thin film it would be obvious to replace the single targets of Hedgcoth (i.e. targets on both sides of the substrate) with groups of targets as taught Masahide because one of ordinary skill in the art would look to producing uniform thin films. (See Masahide discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Hedgcoth by utilizing the features of Masahide because it allows for producing thin films on a substrate.

Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Masahide (Japan 06-158311) as applied to claims 2-8, 11, 14-17 and 20 above, and further in view of Nagano (Japan 01-287269).

The difference not yet discussed is where the magnetron magnet means of at least some of the planar magnetron target assemblies are of different lengths, widths or diameters.

Regarding claims 9 and 18, Nagano teach target assembly 10 having a different length and different width than the other targets 13. Since the targets are of different lengths and widths it would follow that magnetrons utilized would be of different lengths and widths. (See Nagano discussed above)

The motivation for utilizing the features of Nagano is that it allows for forming a film of uniform thickness. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Nagano because it allows for forming a film of uniform thickness.

Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Masahide (Japan 06-158311) as applied to claims 2-8, 11, 14-17 and 20 above, and further in view of Siebert (U.S. Pat. 4,858,556).

The difference not yet discussed is locating targets at different spacings to form the uniform film. (Claims 10 and 19)

Regarding claims 10 and 19, Siebert teach changing distances between a source and substrate to form a uniform thin film. (Column 3 lines 31-37) It therefore follows that having targets in groups at different spacings would achieve the same uniform thin film.

The motivation for utilizing targets at different spacings is that it allows for achieving a uniform thin film. (Column 3 lines 31-37)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized targets at different spacings as taught by Siebert et al. because it allows for achieving uniform thin films.

Claims 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Masahide (Japan 06-158311) as applied to claims 2-8, 11, 14-17 and 20 above, and further in view of Mukai et al. (U.S. Pat. 5,441,615).

The difference not yet discussed is the use of shield members. (Claims 12 and 21)

Regarding claims 12, 21, Mukai et al. teach utilizing deposition shield members for targets. (Column 3 lines 30-32)

The motivation for utilizing the features of Mukai et al. is that it allows for preventing sputtered particles from dispersing to the outside of the deposition shield members. (Column 2 lines 61-65)

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Mukai et al. because it allows for preventing sputtered particles from dispersing to the outside of the deposition shield members.

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Masahide (Japan 06-158311) as applied to claims 2-8, 11, 14-17 and 20 above, and further in view of Nasu et al. (U.S. Pat. 5,326,637).

The differences not yet discussed is depositing a perpendicular magnetic recording medium on a magnetically soft underlayer (claim 22) and the magnetic soft underlayer being 500 to 4,000 Angstroms and being Fe or Fe-Co (claim 23).

Regarding claim 22, Nasu et al. teach depositing a magnetic recording medium by sputtering on a magnetically soft underlayer. (See Abstract)

Regarding claim 23, the magnetic soft underlayer can be Fe, Fe-Co. (See Abstract). The thickness can be 500 Angstroms. (Column 5 lines 28-35)

The motivation for utilizing the features of Nasu et al. is that it allows for producing a film with high recording density and reproduction output. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Nasu et al. because it allows for producing a film with high recording density and reproduction output.

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Claims 2-9, 11, 14-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Hedgcoth (U.S. Pat. 4,894,133) in view of Nagano (Japan 01-287269).

Regarding claim 2, Hedgcoth teach providing targets to coat both sides of a substrate. (See Fig. 1; Column 4 lines 31-35)

Regarding claim 3, Hedgcoth suggest locating target in vertical registry. (See Figs. 1 and 2)

Regarding claim 4, Hedgcoth locating targets 42 in a single vacuum chamber. (See Figs. 1 and 2)

Regarding claim 5, Hedgcoth suggest an in-line arrangement. (See Figs. 1 and 2)

Regarding claim 6, Hedgcoth suggest locating targets 42 and 44 in different vacuum chambers. (See Figs. 1 and 2; Column 4 lines 7-8)

Regarding claim 7, Hedgcoth suggest the plurality of vacuum chamber arranged in-line. (See Figs. 1 and 2)

Regarding claim 8, Hedgcoth suggest that the targets should be magnetron targets. (Column 4 lines 33-35; Column 4 lines 52-55)

Regarding claim 11, Hedgcoth suggest means 6 for transporting and mounting at least one disk shaped workpiece. (Column 4 line 4; Fig. 2)

Regarding claim 15, Hedgcoth suggest locating target in vertical registry. (See Figs. 1 and 2) Hedgcoth teach forming coatings on each of the first and second surface simultaneously. (See Figs. 1, 2)

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Regarding claim 16, Hedgcoth suggest an in-line arrangement. (See Figs. 1 and 2)

Regarding claim 17, Hedgcoth suggest the plurality of vacuum chambers arranged in-line. (See Figs. 1 and 2)

Regarding claim 20, Hedgcoth suggest means 6 for transporting and mounting at least one disk shaped workpiece. (Column 4 line 4; Fig. 2)

The differences between Hedgcoth and the present claims is that utilizing groups of targets to coat both sides of the substrate to produce a uniform thin film is not discussed (Claims 2, 14) and the magnetron magnet means of at least some of the planar magnetron target assemblies are of different lengths, widths or diameters (Claims 9 and 18).

Regarding claims 2, 14, Since Nagano recognize utilizing a group of targets to form a uniform thin film it would be obvious to replace the single targets of Hedgcoth (i.e. targets on both sides of the substrate) with groups of targets as taught Nagano because one of ordinary skill in the art would look to producing uniform thin films. (See Nagano discussed above)

Regarding claims 9 and 18, Nagano teach target assembly 10 having a different length and different width than the other targets 13. Since the targets are of different lengths and widths it would follow that magnetrons utilized would be of different lengths and widths. (See Nagano discussed above)

The motivation for utilizing the features of Nagano is that it allows for forming a film of uniform thickness. (See Abstract)

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Hedgcoth by utilizing the features of Nagano because it allows for producing thin uniform films on a substrate.

Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Nagano (Japan 01-287269) as applied to claims 2-9, 11, 14-18 and 20 above, and further in view of Siebert (U.S. Pat. 4,858,556).

The difference not yet discussed is locating targets at different spacings to form the uniform film. (Claims 10 and 19)

Regarding claims 10 and 19, Siebert teach changing distances between a source and substrate to form a uniform thin film. (Column 3 lines 31-37) It therefore follows that having targets in groups at different spacings would achieve the same uniform thin film.

The motivation for utilizing targets at different spacings is that it allows for achieving a uniform thin film. (Column 3 lines 31-37)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized targets at different spacings as taught by Siebert et al. because it allows for achieving uniform thin films.

Claims 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Nagano (JP 01-287269) as applied to claims 2-9, 11, 14-18 and 20 above, and further in view of Mukai et al. (U.S. Pat. 5,441,615).

The difference not yet discussed is the use of shield members. (Claims 12 and 21)

Regarding claims 12, 21, Mukai et al. teach utilizing deposition shield members for targets. (Column 3 lines 30-32)

The motivation for utilizing the features of Mukai et al. is that it allows for preventing sputtered particles from dispersing to the outside of the deposition shield members. (Column 2 lines 61-65)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Mukai et al. because it allows for preventing sputtered particles from dispersing to the outside of the deposition shield members.

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedgcoth (U.S. Pat. 4,894,133) in view of Nagano (Japan 01-287269) as applied to claims 2-8, 11, 14-17 and 20 above, and further in view of Nasu et al. (U.S. Pat. 5,326,637).

The differences not yet discussed is depositing a perpendicular magnetic recording medium on a magnetically soft underlayer (claim 22) and the magnetic soft underlayer being 500 to 4,000 Angstroms and being Fe or Fe-Co (claim 23).

Regarding claim 22, Nasu et al. teach depositing a magnetic recording medium by sputtering on a magnetically soft underlayer. (See Abstract)

Regarding claim 23, the magnetic soft underlayer can be Fe, Fe-Co. (See Abstract). The thickness can be 500 Angstroms. (Column 5 lines 28-35)

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The motivation for utilizing the features of Nasu et al. is that it allows for producing a film with high recording density and reproduction output. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Nasu et al. because it allows for producing a film with high recording density and reproduction output.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
January 10, 2007